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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,841	03/14/2001	Toshiki Inoue	TALW-0180	3801

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EXAMINER

NICOLAS, WESLEY A

ART UNIT PAPER NUMBER

1741

4

DATE MAILED: 11/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/805,841	<b>Applicant(s)</b> INOUE ET AL.	
	<b>Examiner</b> Wesley A. Nicolas	<b>Art Unit</b> 1741	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \*   c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>3</u> | 6) <input type="checkbox"/> Other:  |

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities:

Page 6, line 20, "Lecture" should be changed to --Lecture"--;

Page 20, line 4, "node" should be changed to --anode--;

Page 20, line 6, "Is" should be changed to --is--.

Appropriate correction is required.

### *Claim Objections*

2. Claim 1 is objected to because of the following informalities: line 7, "0. 1" should be changed to --0.1--.

Appropriate correction is required.

3. Claim 4 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

The language, "*iron ions by 0.1 gram/liter.....pulse reverse electrolytic plating.*"

Is already recited in the independent claim and fails to further limit the claim.

Accordingly, said claim language should be deleted because it is redundant.

4. Claim 8 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper

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dependent form, or rewrite the claim(s) in independent form. In this case, claim 8 is merely a method limitation which does nothing to further define the structure of the apparatus in claim 7.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

6. Claims 1, 3-8, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Dahms et al. (6,099,711).

Claim 1 is rejected because Dahms et al. teach an electrolytic plating method comprising:

- using a wiring board as one pole (Example 4, "circuit board"), and an insoluble electrode as the other pole (col. 6, lines 35-50);
- performing electrolytic plating by applying a forward/reverse current (Fig. 1) with the use of a metal plating solution (col. 8, lines 5-14) which includes iron ions by 0.1 gram/liter or more (col. 8, line 10, "iron(II)sulphate"), so that microvia holes on the wiring board are filled up with metal plating (col. 4, lines 29-30).

Claim 3 is rejected because Dahms et al. teach that the insoluble electrode is configured by a multi-aperture electrode (i.e. mesh or expanded metal) (col. 6, lines 66-67).

Claim 4 is rejected because Dahms et al. teach that the insoluble electrode is configured by a multi-aperture metal mesh (col. 6, lines 66-67); and the metal plating solution is implemented by a copper plating solution (col. 8, lines 5-14) which includes iron ions by 0.1 gram/liter or more (col. 8, line 10, "iron(II)sulphate"), and performs pulse reverse electroplating (Fig. 1).

Claim 5 is rejected because Dahms et al. teach that the metal plating solution is implemented by a copper plating solution (col. 8, lines 5-14); and the wiring board is a printed-circuit board (col. 1, lines 45-49, "circuit board").

Claim 6 is rejected because Dahms et al. teach of arranging a plating bath which accommodates the insoluble electrode and the wiring board (col. 9, lines 58-62), and a copper dissolved bath which supplies copper ions to said plating bath (col. 8, lines 5-14); and circulating the solution with the copper dissolved bath and the plating solution within the plating bath (col. 11, lines 19-24).

Claim 7 is rejected because Dahms et al. teach of an electrolytic plating device for a wiring board, comprising:

- an insoluble electrode which is an electrode (col. 6, lines 35-50) as opposed to a wiring board (Example 4, "circuit board");
- a metal plating solution including iron ions by 0.1 gram/liter or more (col. 8, line 10, "iron(II)sulphate"); and

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- a power source for performing electrolytic plating by applying a forward reverse-current between the wiring board and said insoluble electrode (Fig. 1, and col. 5, lines 58-63).

Regarding the plating solution in claim 7, it is being given little patentable weight because it does not define the structure of the apparatus (as it is a liquid which is easily removed). Furthermore, regarding the "power source for performing electrolytic plating...", although Dahms et al. discloses an identical current but not the specific power source, the power source is inherently present in the prior art because in order to have a current as disclosed by Dahms et al., you need a power source. Furthermore, regarding the specific claim language, claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). Here, Examiner is not reading said limitation as a means-plus-function limitation and therefore said limitation is merely an intended use which is given little patentable weight. If applicant would like to give the claim structural language, he should change "by applying" to "which is adapted to apply."

Claim 8 is rejected because Dahms et al. teach that microvia holes formed on a printed-circuit board are filled up with pulse reverse electrolytic plating (Example 7). As set forth in the claim objections above, this claim is objected to for failure to further limit

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the claim because it does not further define the structure of the apparatus, but merely a result of performing a process.

Claim 11 is rejected because Dahms et al. teach that the insoluble electrode is implemented by a multi-aperture electrode (col. 6, lines 66-67); and the metal plating solution is implemented by a copper plating solution (col. 8, lines 5-14).

7. Claims 1, 5-6, and 7-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Senge et al. (6,129,830).

Claim 1 is rejected because Senge et al. teach an electrolytic plating method comprising:

- using a wiring board as one pole (col. 4, lines 51-59), and an insoluble electrode as the other pole (col. 1, lines 40-44);
- performing electrolytic plating by applying a forward/reverse current (col. 4, lines 60-62) with the use of a metal plating solution (col. 3, lines 55-61) which includes iron ions by 0.1 gram/liter or more (Example 1, "200 mg/l Iron(II) sulphate"), so that microvia holes on the wiring board are filled up with metal plating (col. 2, line 52).

Claim 5 is rejected because Senge et al. teach that the metal plating solution is implemented by a copper plating solution (col. 3, lines 55-61); and the wiring board is a printed-circuit board (col. 1, lines 4-6, "printed circuit boards").

Claim 6 is rejected because Senge et al. teach of arranging a plating bath which accommodates the insoluble electrode and the wiring board (Example 1), and a copper

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dissolved bath which supplies copper ions to said plating bath (Example 1 which relates back to Comparative Example 1); and circulating the solution with the copper dissolved bath and the plating solution within the plating bath (col. 5, lines 12-22, "strong incident flow").

Claim 7 is rejected because Senge et al. teach of an electrolytic plating device for a wiring board, comprising:

- an insoluble electrode which is an electrode (col. 1, lines 40-44) as opposed to a wiring board (col. 4, lines 51-59);
- a metal plating solution including iron ions by 0.1 gram/liter or more (Example 1, "200 mg/l Iron(II) sulphate"); and
- a power source for performing electrolytic plating by applying a forward reverse current between the wiring board and said insoluble electrode (col. 4, lines 60-62).

Regarding the plating solution in claim 7, it is being given little patentable weight because it does not define the structure of the apparatus (as it is a liquid which is easily removed). Furthermore, regarding the specific claim language, claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). Here, Examiner is not reading said limitation as a means-plus-function limitation and therefore said limitation is merely an intended use which is given little patentable weight. If



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applicant would like to give the claim structural language, he should change "by applying" to "which is adapted to apply."

Claim 8 is rejected because Senge et al. teach that microvia holes formed on a printed-circuit board are filled up with pulse reverse electrolytic plating (col. 2, line 52 and col. 4, lines 60-62). As set forth in the claim objections above, this claim is objected to for failure to further limit the claim because it does not further define the structure of the apparatus, but merely a result of performing a process.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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10. Claims 2 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dahms et al. as applied to claims 1 and 7 above, and further in view of Schumacher et al. (5,976,341).

Dahms et al. are as applied, argued, and disclosed above and incorporated herein but fail to specifically teach a stirring unit which makes the metal solution flow parallel to a surface to be plated of the wiring board.

Schumacher et al. teach of an electrolytic deposition method and apparatus which uses iron in a concentration of 0.1 to 50 g/L (col. 6, line 23) and which further flows metal solution parallel to a surface to be plated of the wiring board (col. 8, lines 65-67; col. 10, lines 41-43; and Fig. 3, nozzle below numeral 15).

Claims 2 and 9 are rejected because it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified the Dahms et al. invention to make the plating solution flow in parallel to the surface to be plated as taught by Schumacher et al. because Schumacher et al. teach that the metal plating solution is stirred to flow in parallel to a surface to be plated of the wiring board (col. 8, lines 65-67; col. 10, lines 41-43; and Fig. 3, nozzle below numeral 15) which would have decreased the ion diffusion boundary layer adjacent to the substrate, allowing for an efficient, uniformly plated layer.

Claim 10 is rejected because Dahms et al. teach of a plating bath accommodating the insoluble electrode and the wiring board (col. 9, lines 58-62), and a copper dissolved bath supplying copper ions to said plating bath (col. 8, lines 5-14);

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wherein said stirring unit circulates the solution with the copper dissolved bath and the plating solution within the plating bath (col. 11, lines 19-24).

11. Claims 2 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Senge et al. as applied to claims 1 and 7 above, and further in view of Schumacher et al. (5,976,341).

Senge et al. are as applied, argued, and disclosed above and incorporated herein but fail to specifically teach a stirring unit which makes the metal solution flow parallel to a surface to be plated of the wiring board.

Schumacher et al. teach of an electrolytic deposition method and apparatus which uses iron in a concentration of 0.1 to 50 g/L (col. 6, line 23) and which further flows metal solution parallel to a surface to be plated of the wiring board (col. 8, lines 65-67; col. 10, lines 41-43; and Fig. 3, nozzle below numeral 15).

Claims 2 and 9 are rejected because it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified the Senge et al. invention to make the plating solution flow in parallel to the surface to be plated as taught by Schumacher et al. because Schumacher et al. teach that the metal plating solution is stirred to flow in parallel to a surface to be plated of the wiring board (col. 8, lines 65-67; col. 10, lines 41-43; and Fig. 3, nozzle below numeral 15) which would have decreased the ion diffusion boundary layer adjacent to the substrate, allowing for an efficient, uniformly plated layer.

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Claim 10 is rejected because Senge et al. teach of a plating bath accommodating the insoluble electrode and the wiring board (Example 1), and a copper dissolved bath supplying copper ions to said plating bath (Example 1 which relates back to Comparative Example 1); wherein said stirring unit circulates the solution with the copper dissolved bath and the plating solution within the plating bath (col. 5, lines 12-22, "strong incident flow").

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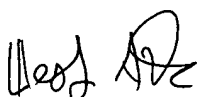
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley Nicolas whose telephone number is (703)305-0082. The examiner can normally be reached on Mon.-Thurs. from 7am to 5pm.

The Supervisory Primary Examiner for this Art Unit is Nam Nguyen whose telephone number is (703) 308-3322.

The fax number for this Group is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703)308-0661.



Wesley Nicolas

November 3, 2002